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OBSERVATIONS OF THE DIFFUSE UV RADIATION FIELD

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We present spectra of the diffuse UV radiation field between 1250 - 3100 Å from eight different regions of the sky (Table 1), which were obtained with the Johns Hopkins UVX experiment. UVX flew aboard the Space Shuttle Columbia (STS-61C) in January 1986 as part of the Get-Away Special project. The experiment consisted of two 1/4 m Ebert-Fastie spectrometers, covering the spectral ranges 1250 - 1700 Å at 17 Å resolution and 1600 - 3100 Å at 27 Å resolution, respectively, with a field of view of 4° x .25°, sufficiently small to pick out regions of the sky with no stars in the line of sight.

TABLE 1
TARGET LIST

Target	Name	Scan	l	b	Notes
1	CLEAR	-	155	58	clear region at high latitude
2	DUST	-	132	40	dusty region at high latitude
3 (start)	COMA	14°	71	82	scan across Coma cluster of
3 (end)			240	84	galaxies
4	HALLEY	-			vicinity of Comet Halley
5	QUIET	-	168	-16	region of low soft X-ray emission
6 (start)	GRADIENT	17°	135	26	scan from region of low HI to
6 (end)			135	9	high HI column density
7 (start)	EXTERNAL	12°	142	47	scan across M81 and Sandage (1976)
7 (end)			142	35	dusty region
8	ERIDANUS	-	216	-39	very active region in Eridanus (Paresce *et al.* 1983)
9 (start)	SPECTRUM	12°	335	86	region observed by Feldman, Brune,
9 (end)			335	74	and Henry (1981)

We find values for the diffuse cosmic background ranging in intensity from 300 to 900 photons cm^{-2} s^{-1} sr^{-1} $Å^{-1}$ (see Table 2) with no correlation with the HI column density in the line of sight, and with a factor of two variation in targets only 11° apart in the sky, implying that either the diffuse cosmic background is not due to starlight reflected from interstellar dust, and therefore is presumably extragalactic in origin, or that, if it is due to reflected starlight, the dust-to-gas ratio varies considerably in different directions.

We also find that the cosmic background is spectrally flat from 1250 - 3100 Å, within the uncertainities of each spectrometer.

The zodiacal light begins to play a significant role in the diffuse radiation field above 2000 Å, and we have determined its brightness relative to the solar emission. Our observed brightnesses of the zodiacal light in the UV remain almost constant with ecliptic latitude, unlike the declining visible brightnesses, possibly indicating that those (smaller) grains responsible for the UV scattering have a much more uniform distribution with distance from the ecliptic plane than do those grains responsible for the visible scattering.

Finally, there is no evidence in our data for the line emission claimed by Feldman, Brune, and Henry (1981) in one of our target regions (Target 9). It should, however, be noted that the errors in our spectra are too large to formally rule out any of those lines.

TABLE 2
BEST FIT PARAMETERS

	Long Wavelength Spectrometer			Short Wavelength Spectrometer	
Target	d[1]	α[2]	b[3]	d[1]	b[3]
1.	.158	81.4 ± 1.9	700. ± 70.	0.67	500
2.	.148	78.0 ± 1.6	950. ± 70.	1.95	500
3.	.194	72.8 ± 2.0	330. ± 80.	2.17	200
5.	.362	86.3 ± 1.9	260. ± 80.	1.46	300
6.	.384	74.6 ± 3.3	420. ± 90.	1.40	700
7.	.255	65.8 ± 3.6	340. ± 100.	1.20	500
8.	.181	58.3 ± 1.6	650. ± 80.	1.07	200
9.	.274	81.3 ± 2.4	520. ± 120.	0.11	100

[1]counts per 20.48 ms bins.
[2]S10 units (6.35×10^{-12} of the solar irradiance per steradian).
[3]photons cm^{-2} s^{-1} sr^{-1} $Å^{-1}$

References

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